THE INSTRUCTOR: Dr. Bernard Giffler is a senior scientist in the Applied Research and Management Sciences Division of C-E-I-R, INC. He has been engaged in work in production and inventory control since 1953. Before joining C-E-I-R he served as adjunct associate professor in New York University's Department of Industrial Engineering and Operations Research, as manager, management science, in the Data Information Systems Division of the International Telephone and Telegraph Corp., and as senior mathematician for IBM Corporation's Research and Advanced Systems Development Divisions. His published papers on production planning and scheduling have appeared in the journals of the Operations Research Society of America and The Institute for Management Science, and in *Naval Research Logistics Quarterly*.

REGISTRATION: Tuition, including luncheons and course materials, is $195 for the first student and $175 for each additional student from the same organization. Attendance at this seminar will be limited to 25 students. Classes begin at 9 o'clock a.m. and continue through 5 p.m. Hotel rooms are not included.

HOTEL ACCOMMODATIONS: Students are encouraged to stay at Tarrytown House, a facility for executive seminars, in order to derive maximum benefit from the three day course. The charge for room and meals is $22 per day, payable to Tarrytown House. Forms for room reservations, and limousine schedules to and from New York airports will be mailed with confirmation of registration.

OTHER COURSES: The Institute for Advanced Technology programs covers many subjects in the field of data processing and management science. Among those now scheduled are:

BUSINESS FORECASTING: Introduction to scientific forecasting techniques for business executives. Tarrytown, N. Y., April 27-29.

ADVANCED PROJECT PLANNING and CONTROL SYSTEMS: Management planning and control of project situations. Washington, D. C., March 29-31.

LIST PROCESSING and STRUCTURED DATA: Introduction to symbolic programming in commercial data processing. Washington, D. C., June 7, 8, 9, 1966.

For an outline of these or other courses in the IAT program, write:

Registrar,
Institute for Advanced Technology
C-E-I-R INC
1200 Jefferson Davis Highway
Arlington, Virginia 22202

ADVANCED METHODS FOR PRODUCTION SCHEDULING AND INVENTORY CONTROL

A three-day Seminar,
April 25, 26, 27, 1966
Tarrytown House
Tarrytown, N. Y.

Describes new techniques in production scheduling and inventory control that are designed for computer application. The seminar is intended for personnel interested in these applications. Some background in mathematics is required for an understanding of the workings of these techniques. Data processing background is not required. The techniques covered in the lectures include: forecasting demand and lead-time, finding optimum safety stocks and economic order quantities, exploding and netting factory orders, machine loading and scheduling, and new techniques for detail scheduling. Tuition, including luncheons and course materials, is $195 for the first student and $175 for others from the same organization.

C-E-I-R INC.
Institute for Advanced Technology
1200 Jefferson Davis Highway
Arlington, Virginia 22202
Area code 703 — 684-6377

COURSE OUTLINE

FIRST DAY

MORNING: **The Production Control Cycle**

Describes and inter-relates basic production control operations, including production and product mix planning, order entry, parts explosion and netting, inventory allocation, set-forward and set-back scheduling, machine loading, detail scheduling, and the design and maintenance of basic engineering and sales/inventory files.

AFTERNOON: **Forecasting for Inventory Control**

Shows how moving average and exponential smoothing techniques are used to predict total demand for the firm's end-products and their components, and to predict manufacturing or purchase lead-time for these items. These forecasts are used to calculate economic safety stocks and order quantities.

SECOND DAY

MORNING: **Inventory Decisions and Procedures**

Describes and illustrates the computation of economic safety stocks and re-order quantities, for single items and for all items jointly. Accounting procedures for the routine maintenance of the inventory balances are also described.

AFTERNOON: **Production and Product Mix Planning**

New computational techniques are described which have been developed to speed and simplify parts explosion and netting computations. The lecturer indicates how these techniques can be adapted for cost pyramiding and determination of optimal product and resource mixes.

THIRD DAY

Machine Loading and Scheduling

Covers the generation of set-forward and set-back schedules and their use to project manpower and machine loads, and to determine scheduling priorities. Also describes the C-E-I-R Scheduler II Program System. This program generates and evaluates detail schedules — schedules that specify both the time and the specific facility on which each operation is to be performed. Examples of preparation of problems for the Scheduler program and sample results are displayed and discussed, together with consideration of this detail scheduling capability in an integrated composer-based production control system.

C-E-I-R INC is an international applied research and data processing corporation that offers analytical, scientific and computer services to business, science and government. Founded in 1954, it is today the world's largest, most experienced and best equipped independent organization in its field. The C-E-I-R professional staff includes several hundred mathematicians, statisticians, economists, operations researchers, management scientists and others from a variety of disciplines. In addition, many of the finest scientific and professional men in America are retained on a consultant basis. Augmenting this professional capability are modern electronic computing equipment, and skilled computer programmers and operations personnel at computing centers in five major U.S. cities, London, The Hague and Mexico City.

IAT INSTITUTE FOR ADVANCED TECHNOLOGY is the latest expression of C-E-I-R's long-standing involvement in management education. The revolutionary nature of computer-based methods made education an integral part of C-E-I-R operations from the beginning. This relationship is formalized through the Institute for Advanced Technology. IAT faculty members are drawn primarily from the ranks of C-E-I-R's professional and computer operations staffs. Its curriculum is drawn from subjects in which C-E-I-R staff members are expert—recognized for excellence in day-to-day application of the art and science of computer usage to the real problems of C-E-I-R customers in business and industry. Sharing these new skills through seminars in major cities, management clinics, and special, in-plant training programs is the major goal of the Institute for Advanced Technology.

BUSINESS REPLY MAIL

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FIRST CLASS
PERMIT NO. 35700
WASHINGTON, D. C.

Registrar
Institute for Advanced Technology
C-E-I-R, Inc,

1200 Jefferson Davis Highway
Arlington, Virginia

INSTITUTE FOR ADVANCED TECHNOLOGY

C-I-A-T INC.

ADVANCED METHODS
FOR PRODUCTION SCHEDULING AND INVENTORY CONTROL

A three-day Seminar

Describes new techniques in production scheduling and inventory control that are designed for computer application. The seminar is intended for personnel with production and inventory responsibility and for data processing personnel interested in these applications. Some background in mathematics is required for an understanding of the workings of these techniques. Data processing background is not required. The techniques covered in the lectures include: forecasting demand and lead-time, finding optimum safety stocks and economic order quantities, exploding and netting factory orders, machine loading and scheduling, and new techniques for detail scheduling. Tuition, including luncheons and course materials, is $195 for the first student and $175 for others from the same organization.

April 25, 26, 27
Tarrytown House
Tarrytown, New York

Register me for: ADVANCED METHODS FOR PRODUCTION SCHEDULING AND INVENTORY CONTROL ☐

NAME:_____

TITLE:_____

COMPANY:_____

ADDRESS:_____

_____

PHONE:_____

Please Register This Additional Student:

NAME:_____

TITLE:_____

CHECK ENCLOSED ☐ Bill My Company ☐

C-E-I-R INC.

INSTITUTE FOR ADVANCED TECHNOLOGY 1200 JEFFERSON DAVIS HIGHWAY • ARLINGTON, VIRGINIA 22202 • (703) 684-6377

NEW APPROACHES

TO PRODUCTION AND

INVENTORY MANAGEMENT

Dear Sir;

"Advanced Methods for Production Scheduling and Inventory Control" is a seminar that will familiarize you with new approaches to this important responsibility. These new approaches can help you do a better job, and can make getting the job done a lot easier.

The seminar is aimed at the two people who are most interested in production and inventory management -- the manager with line responsibility, and the data processing or systems man responsible for helping him to implement these new methods.

These are management science techniques. They involve use of a computer. The techniques are based in mathematics, and to get full benefit from the seminar you should have done pretty well in high school algebra -- if you've gotten rusty since then you might freshen up on the subject before the seminar begins. We would like to tell you math isn't important, but to understand this approach to production scheduling and inventory control you have to be able to read an equation.

Your benefit from this seminar is two-fold. First, you will learn about ways to modernize, mechanize, and improve your ability to handle this responsiblility. Second, it will help you bridge the gap that often exists between the production specialist who is not an expert on computer systems design, and the data processing man who may not be up to date on the best techniques for solving production scheduling and inventory control problems.

The instructor has an excellent background in this field and was responsible for development of C-E-I-R's Scheduler II Program System. Scheduler II's use in generating and evaluating detail schedules will be covered as part of the seminar.

In order to make it possible for you to derive maximum benefit from the class, the number of registrations is limited to twenty-five. The class sessions will be aimed at covering the rather full outline described in the

enclosed booklet, and the instructor will be available for discussion of individual problems after hours all three days of the seminar.

To reserve your place at this informative presentation, please call, or mail the enclosed registration card today.

Sincerely,

Robert D. Nixon

Robert D. Nixon
Director of Curriculum

THE INSTRUCTOR: Milton L. Godfrey is a C-E-I-R, INC., senior operations research analyst with broad experience in the practical uses of scientific techniques in industry. In his current assignment at the C-E-I-R Research and Computing Center in New York, Godfrey is responsible for a wide variety of operations research projects, mathematical analyses, information systems, and econometric studies. Before he joined C-E-I-R's professional staff he served in various management capacities with Talon, Inc., and Chase Aircraft, and as a consultant for leading organizations. He is a registered professional engineer and author of several papers on applications of linear programming.

REGISTRATION: Tuition, including computer processing of the student exercise, noon meals, and course materials, is $195 for the first student and $175 for each additional student from the same organization. Classes begin each day at 9 a.m. and continue through 5 p.m. Hotel rooms are not included.

HOTEL ACCOMMODATIONS: Students are encouraged to stay at Tarrytown House, a facility for executive seminars, in order to derive maximum benefit from the three day course. The charge for room and meals is $22 per day, payable to Tarrytown House. Forms for room reservations, and limousine schedules to and from New York airports will be mailed with confirmation of registration.

OTHER COURSES: The C-E-I-R seminar program covers subjects in the field of data processing and the management sciences. Among those currently scheduled are:

PROJECT MANAGEMENT: An advanced course which presents new techniques for project managers. Washington, D. C., March 29-31.

PRODUCTION SCHEDULING: Techniques for handling scheduling and inventory problems by computer. Tarrytown, N. Y., April 25-27.

LIST PROCESSING: Introduction to use of symbollic programming for business applications. Washington, D. C., June 7-9.

For an outline of these courses, or to be placed on the seminar mailing list, write:

Registrar
Institute for Advanced Technology
C-E-I-R INC
1200 Jefferson Davis Highway
Arlington, Virginia 22202
Phone: Area Code 703/684-6377

Business Forecasting

A three-day Management Seminar

April 27-29
Tarrytown House
Tarrytown, N. Y.

A survey of scientific forecasting techniques and their business uses, with emphasis on applications in marketing. Intended for management personnel with a need to understand what forecasting methods are available to them, how they work, and their advantages and disadvantages. Students should be familiar with algebra at the high school level. Each student should bring a set of data such as sales, production or inventory records relevant to his interest. This will be processed on an IBM 7094 computer as a class exercise, using the C-E-I-R Time Series Analysis and Spectral Analysis programs, two important forecasting tools.

C-E-I-R INC

Institute for Advanced Technology
1200 Jefferson Davis Highway
Arlington, Virginia 22202
Area Code 703 — 684-6377

BUSINESS FORECASTING
Course Outline

The Use of Forecasts

- Short range
- Long range

Components of Time Series

Reliability of Forecasts

- Forecast bias
- Forecast variance

Assumptions Made in Forecasting

- Forecasting aggregates
- Forecasting details

Forecasting Models

Analyzing Historic Data

- Time series analysis
- Autocorrelation analysis
- Regression analysis
- Spectral analysis
- Markov analysis

Economic Indicators

- What they are
- How they are used

Forecasting Models for Short Range Control

- Moving average
- Exponentially smoothed
- Regressive
- Function matching: highly seasonal products
- Coping with promotional sales policies

Forecasting Models for Long Range Planning

- Trend projections
- Component projections
- Corrections for economic conditions
- Sales quotas and self-fulfilling prophesies
- Econometric models
  - Input/output
  - Linear programs
  - Simultaneous equations
- Gaming models

Forecasting as Part of an Operating System

- Open loop operation
- Closed loop operation
- Stability
- System performance

Use of Simulation of Operating Systems

- Simulation language
- Time related systems
- Event related systems
- Simulation concepts
- Simulation analysis

Market Testing as a Basis for Forecasting

- Design of the test
- Analysis of the test

General Discussion

STUDENT EXERCISE: Each student is invited to submit in advance of the seminar a set of data relevant to his own problems or interests. This data will be processed on an IBM 7094 at the C-E-I-R, INC., computing center using both the C-E-I-R Time Series Analysis and Spectral Analysis programs, to illustrate use of two important forecasting tools.

The set of data should relate to a single element, such as sales of one product, or units of production or inventory, and should be set up on a monthly basis. For a useful analysis, this historic data should cover approximately five years (60 months).

Students may submit either actual or hypothetical data. The result of computer processing will be a useful and meaningful data analysis in itself, as well as a reinforcement of the learning process.

Simple and detailed instructions for preparing student data and the required forms will be forwarded to students with confirmation of their registration.

C-E-I-R INC. is an international applied research and data processing corporation that offers analytical, scientific and computer services to business, science and government. Founded in 1954, it is today the world's largest, most experienced and best equipped independent organization in its field. The C-E-I-R professional staff includes several hundred mathematicians, statisticians, economists, operations researchers, management scientists and others from a variety of disciplines. In addition, many of the finest scientific and professional men in America are retained on a consultant basis. Augmenting this professional capability are modern electronic computing equipment, and skilled computer programmers and operations personnel at computing centers in five major U.S. cities, London, The Hague and Mexico City.

INSTITUTE FOR ADVANCED TECHNOLOGY

C-E-I-R INC.

BUSINESS FORECASTING

A survey of scientific forecasting techniques and their business uses, with emphasis on applications in marketing. Intended for management personnel with a need to understand what forecasting methods are available to them, how they work, and their advantages and disadvantages. Students should be familiar with algebra at the high school level. Each student should bring a set of data (such as sales, production, or inventory records) relevant to his interest. This will be processed on an IBM 7094 computer as a class exercise, using the C-E-I-R Time Series Analysis and Spectral Analysis programs, two important forecasting tools.

Tarrytown House
Tarrytown, N. Y.
April 27-29

Register me for: BUSINESS FORECASTING ☐

NAME: _____

TITLE: _____

COMPANY: _____

ADDRESS: _____

_____

PHONE: _____

Please Register This Additional Student:

NAME: _____

TITLE: _____

CHECK ENCLOSED ☐ Bill My Company ☐

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FIRST CLASS
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INSTITUTE FOR ADVANCED TECHNOLOGY 1200 JEFFERSON DAVIS HIGHWAY • ARLINGTON, VIRGINIA 22202 • (703) 684-6377

HOW MUCH

IS A BETTER

FORECAST WORTH?

Dear Sir:

If your responsibility involves making or using business forecasts you should consider attending this unusual seminar. It combines a thorough analysis of available scientific forecasting techniques and their applications with actual computer processing of data from your own desk.

The seminar is taught by Milton L. Godfrey, an experienced instructor and a veteran management sciences consultant from C-E-I-R's New York research center. His presentation is in layman's language, intended for the manager whose concern is with the end result, rather than the niceties along the way. For maximum benefit from his course you will, however, need the equivalent of a good high school course in algebra -- but you will not be overwhelmed with mathematical detail.

During his three-day presentation, Godfrey will introduce you to the major forecasting techniques and tell you their strengths and weaknesses, their information requirements, and situations where each method is used to its best advantage.

As indicated in the enclosed outline, the seminar covers forecasting reliability, necessary assumptions, design considerations, models for both short- and long-term control, and other important elements of the forecasting trade.

As a seminar participant you will have an opportunity to submit data from your own operation, and you will be given the results after this data is processed on a powerful IBM 7094 computer, using both the time series analysis and spectral analysis programs.

Your material for this class exercise may be real or hypothetical, and should include monthly figures for at least a five-year period concerning a single product's sales, or its production, inventory or some other activity. Before the seminar you will be sent detailed instructions concerning this feature of the seminar.

This class exercise, included in the seminar at no extra cost, is in itself of considerable value both from the standpoint of computer time consumed and that of the analysis of your data.